

REMARKS

I. Status of Claims

Claims 14-15 and 17-28 are pending. Claims 14-15 and 17-28 stand rejected. Applicants respectfully acknowledge that the office has withdrawn the rejections under 35 U.S.C. § 112. See Office Action at 12.

II. Interview

Applicants thank the Examiner and Supervisory Patent Examiner Steven P. Griffin for their time to discuss the instant application with the undersigned on June 14, 2010. As noted in the Interview Agenda, submitted June 10, 2010, Applicants discussed the claims in light of the art of record: U.S. Patent Application No. 2003/0024278 A1 to Berkey et al. ("Berkey") and U.S. Patent No. 4,684,383 to Cavender, Jr. et al. ("Cavender"). Applicants presented arguments on the inventiveness of the claimed range of central hole diameter after the drying and consolidating steps, and in particular that the cited references, despite their lengthy disclosure, fail to provide any guidance to one of skill in the art to arrive at the claimed central hole diameter range. Applicants also discussed the possibility of submitting a Declaration with data showing the criticality of the claimed central hole diameter range, and attach an Executed Declaration with such data. The Examiner said she would consider any such data when a Response and Declaration had been filed.

III. Rejections Under 35 U.S.C. § 103

The Office rejects claims 14, 15, and 17-28 under 35 U.S.C. § 103(a) as allegedly “being unpatentable” over Berkey for the reasons provided at pages 2-13 of the Final Office Action. Applicants respectfully disagree and traverse these obviousness rejections for the reasons set forth below.

With respect to obviousness, several basic factual inquiries must be made in order to determine the obviousness or non-obviousness of claims under 35 U.S.C. § 103. These factual inquiries, set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 17, 148 U.S.P.Q. 459, 467 (1966), require the Examiner to:

- (1) Determine the scope and content of the prior art;
- (2) Ascertain the differences between the prior art and the claims in issue;
- (3) Resolve the level of ordinary skill in the pertinent art; and
- (4) Evaluate evidence of secondary considerations.

The obviousness or nonobviousness of the claimed invention is then evaluated in view of the results of these inquiries. *Graham*, 383 U.S. at 17-18, 148 U.S.P.Q. at 467; *see also KSR Int’l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1730, 82 U.S.P.Q.2d 1385, 1388 (2007).

Applicants submit that the Office cannot establish that Berkey teaches or suggests each and every element recited in the claims. The Office acknowledges that Berkey “is silent regarding the diameter of the central hole at the end of the drying and consolidating step.” Office Action at 4. The Office argues that nonetheless, Berkey “clearly expresses concern and appreciation of the significance of the hole diameter at the end of the drying and consolidating step” and thus that it would be “obvious to

optimize as a result effective variable.” Office Action at 12-13. Applicants respectfully disagree.

A result effective variable is “a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. M.P.E.P. § 2144.05. The M.P.E.P. cites *In re Antonie*, 559 F.2d 618, 195 U.S.P.Q. 6 (CCPA 1977) for guidance. In *In re Antonie*, the CCPA determined that the claim element, tank volume to diameter ratio, was not a result effective variable because the prior art did not recognize that varying tank volume to diameter ratio affected treatment capacity (an unclaimed property), despite the Examiner arguing that the prior art taught an interest in improving efficiency. 195 U.S.P.Q. at 8. Like the prior art in *In re Antoine*, Berkey does not teach or suggest to a person skilled in the art that varying central hole diameter after drying and consolidating affects any desired property, let alone attenuation of the resultant fiber. The central hole diameter is a variable unlike concentration, temperature, or pressure with regard to optimization of ranges under M.P.E.P. § 2144.05. Unlike these variables as described in M.P.E.P. § 2144.05, modifying central hole diameter does not achieve a recognized result, as demonstrated below by the lack of guidance in Berkey regarding the effect of reducing the central hole diameter too much. Thus, optimizing the central hole diameter does not constitute routine experimentation, rendering the claimed range nonobvious. See M.P.E.P. § 2144.05.

To show that central hole diameter is a result effective variable, the Examiner first cites to paragraphs 114 and 115 to show that central hole diameter is a result

effective variable. Final Office Action at 4. Yet Berkey does not do so. Namely

Paragraph 114 recites in relative part:

If the preform 100 has a **sufficiently small** nominal inside diameter and if the preform is raised to a high enough temperature, the centerline region of the preform may finally collapse upon itself without the assistance of vacuum and/or without the assistance of pulling or drawing upon one or more ends of the preform.”

(emphasis added). Paragraph 115 recites in relative part:

. . . if the nominal diameter is **relatively large**, the application of a vacuum to the centerline aperture, and/or the application of a pulling force on one or more ends of the preform may be desirable . . . or may even be necessary to close the hole.

(emphasis added). There is no recognized result in the preform that is achieved as a result of varying central hole diameter. At best, the recited paragraphs provide a decision tree for one skilled in the art: If X, do Y, otherwise Z.

Moreover, a person of ordinary skill in the art, reading Berkey, would not know what Berkey believes to be “sufficiently small” or “relatively large.” There is no guidance to suggest that this vague range even overlaps or encompasses the claimed range of about 0.05mm to about 0.40mm. In fact, in the one example described in Berkey, a central hole diameter after drying and consolidating of 7 mm was obtained; significantly larger than the claimed range of about 0.05mm to about 0.40mm. See Berkey at ¶¶ [0133] - [0134]. One of ordinary skill in the art, reading Berkey, would assume that the 7 mm central hole diameter from the example in Berkey satisfies the requirements that the central hole diameter be sufficiently small, despite the fact that this diameter is an order of magnitude larger than the claimed range of the present invention. Berkey’s

teaching of a central hole diameter of 7 mm in the example further emphasizes the lack of guidance to achieve the much smaller claimed range and that Berkey's acceptable range may be wholly different from the claimed range.

The Examiner next relies upon paragraphs 116 and 119 of Berkey. Final Office Action at 4. Yet, they too have no bearing on whether modifying the central hole diameter effects a known property. Paragraph 116 discusses that "the present invention may be applied to partially closing the centerline aperture in two or more steps . . . the centerline aperture would have an improved circularity, and/or symmetry" In other words, Berkey's advantage of improved circularity and/or symmetry is associated with the procedure of using multiple steps, and allegedly would exist irrelevant of the hole size after drying and consolidating. Paragraph 119 associates vacuum level and temperature as result effective variable because they affect hole size, circularity, and/or symmetry. This does not suggest that hole size itself is a result effective variable.

Nonetheless, in support of the criticality of the claimed range of about 0.05mm to about 0.4mm for the central hole diameter after the end of the drying and consolidating step, Applicants have submitted an executed Declaration by Franco Cocchini, one of the named inventors. Mr. Cocchini explains that 27 preforms were prepared and formed into optical fibers (typically 6 per perform). Decl. at ¶¶ 7-8. The average central hole diameter was measured after the drying and consolidating step, which included a thermal treatment. *Id.* at ¶¶ 7, 9. Attenuation loss was measured for each optical fiber. *Id.* at ¶¶ 8, 10. Figure 1, attached to the Declaration, represents the charting of the

collected data with a trend line obtained by applying the least squares method with a polynomial fitting line with degree equal to 3. *Id.* at ¶ 11.

One can reasonably conclude from the results reported in Figure 1 that optical fibers produced from preforms with central hole diameters after the end of the drying and consolidating step in the range of about 0.05mm to about 0.40mm result in significantly lower attenuation loss as compared with optical fibers produced from preforms with central hole diameters after the end of the drying and consolidating step falling outside the range of about 0.05mm to about 0.40mm. *Id.* at ¶ 12. In particular, Applicants had discovered that a diameter of greater than 0.4mm should be avoided because of a non-negligible OH ion/water molecule rewetting of the central hole and the resultant attenuation losses. *Id.* Applicants also discovered that a diameter less than about 0.05mm should be avoided because of internal defects formed and the resultant attenuation losses. *Id.*

Moreover, based on Mr. Cocchini's education and experience, it is his opinion that one of ordinary skill in the art would not have expected an optical fiber, produced from a preform with a central hole diameter after the end of the drying and consolidating step in the range of about 0.05mm to about 0.40mm, would exhibit significantly lower optical loss than an optical fiber, produced from a preform with a central hole diameter after the end of the drying and consolidating step falling outside the claimed range. *Id.* at 13

In light of the lack of guidance in Berkey regarding the actual diameter range to be achieved, and the demonstrated criticality of the claimed range of central hole

diameter after the end of the drying and consolidating step, Applicants submit that the invention as claimed is not obvious.

IV. Conclusion

In view of the foregoing remarks and the attached Executed Declaration, Applicants respectfully request reconsideration of this application and the timely allowance of the pending claims.

If the Examiner believes a telephone conference could be useful in resolving any outstanding issues, she is respectfully invited to contact Applicant's undersigned counsel at (202) 408-4275.

Please grant any extensions of time required to enter this response and charge any additional required fees to our Deposit Account No. 06-0916.

Respectfully submitted,

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